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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/775,315	02/01/2001	Hyun-Sook Jung	41671/P849	8247
23363 7590 04/12/2013 CHRISTIE, PARKER & HALE, LLP PO BOX 29001 Glendale, CA 91209-9001			EXAMINER ANTHONY, JULIAN	
			ART UNIT 1726	PAPER NUMBER
			NOTIFICATION DATE 04/12/2013	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

pto@cph.com

Office Action Summary	Application No. 09/775,315	Applicant(s) JUNG ET AL.	
	Examiner JULIAN ANTHONY	Art Unit 1726	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 October 2012.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 1-4 and 11 is/are pending in the application.
- 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-4 and 11 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 3) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>10-12-11</u> . | 4) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114 was filed in this application after a decision by the Board of Patent Appeals and Interferences, but before the filing of a Notice of Appeal to the Court of Appeals for the Federal Circuit or the commencement of a civil action. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on October 5, 2012 has been entered.

Claims 1-4 and 11 are pending.

Information Disclosure Statement

The IDS filed on October 12, 2011 has NOT been considered. Although applicant states that a copy of each listed Foreign Patent Document and Other Documents is enclosed, no copies thereof are present in the file.

Claim Rejections - 35 USC § 112

The following is a quotation of 35 U.S.C. 112(b):

(B) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4 and 11 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Claim 1 recites the limitation $\text{Li}_{1.03}\text{Ni}_{0.8}\text{Mn}_{0.2}\text{O}_2$ in line 3. The coefficients are understood as ratios of each of the elements to each other. The coefficient for Li has three significant figures, while each of the coefficients for Ni, Mn and O have only one. Thus, a comparison of the amount of Li relative to Ni, Mn and O cannot be accurately ascertained. Giving this chemical formula its broadest reasonable interpretation, the coefficient for Li is given one significant figure such that Li is present as Li_1 in order to compare the amount of Li with Ni, Mn and O accurately and precisely.

The term "trace amount" in claim 11 is a relative term which renders the claim indefinite. The term "trace amount" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Giving trace amount its broadest reasonable interpretation in a manner not inconsistent with the specification, the term "trace amount" is interpreted as the amount which is left behind after evaporation.

Claim 2 recites coefficients for LiNiMnO that, in reciting ranges, are broader in scope than the coefficients for the same as recited in claim 1. Thus, the scope of claim 2 is indefinite.

Claims 2-4 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being dependent upon a rejected base claim.

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mayer (U.S. Pat. 5,783,333).

Mayer teaches a lithium battery comprising a positive electrode, a negative electrode and an electrolyte, with the positive electrode having an active material of lithium nickel cobalt oxides and lithium manganese oxides. (col. 10 line 48 et seq.) The lithium manganese oxides and lithium nickel cobalt oxides remain distinct chemical species, i.e. "the mixtures of this invention will include 'particles' of a first chemically distinct positive electrode material interspersed with 'particles' of a second chemically distinct positive electrode material." (col. 8 lines 46-49) A conductive agent such as carbon is disclosed. (col. 12 line 40 et seq.) The electrodes include a first polymeric binder such as PVDF and a second binder such as water, or a water dispersion of PTFE. (col. 15 lines 40-61, (col. 16 lines 40-47)) To the extent that a "trace amount" of binder is understood for the reasons set forth under 35 U.S.C. 112, second paragraph (discussed above), the solvent of the slurry comprising the binders are evaporated, thus leaving behind a trace amount of the binder or binders.

Mayer does not explicitly teach the ratio of the lithium nickel cobalt oxide and lithium manganese oxide as being less than 1:1. However, a weight ratio of the lithium manganese

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oxides to lithium nickel cobalt oxides of less than 1:1 would have been obvious to the skilled artisan as a routine modification of the product absent of a showing of unexpected results. *In re Thorpe*, 227 USPQ 964 (Fed. Cir. 1985). In particular, Mayer specifically teaches that blending of the two components requires optimization of their respective weights in order to obtain matched cycle ratios within the positive and negative electrode couple. See col. 10 line 14 et seq., to wit, "it may be desirable to choose relative amounts of the two or more positive electrode materials to provide an 'overall' blended first cycle charge/discharge ratio that matches the ratio for the negative electrode." Thus, absent of unexpected results it is asserted that the weight proportions of the positive electrode active materials are optimizable parameters for a result-effective variable, which in this particular case is "the cell's energy density...." *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Applicant's arguments filed with the present amendment have been fully considered, however these arguments are not found persuasive. Applicant submits that Mayer does not teach a trace amount of polymeric binder. Notwithstanding the rejection under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph (discussion above), this argument is not persuasive in view of Mayer's teaching of PVDF, which is subsequently evaporated so as to leave a trace amount, or at least as would be obvious to one of ordinary skill in the art.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pynenburg et al. (U.S. Pat. 5,429,890) in view of Hasegawa et al. (U.S. Pat. 5,370,948) and as evidenced by Imachi (U.S. Pat. 7,056,622 B2).

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Pynenburg teaches a positive active material for a lithium battery comprising a lithium manganese oxide, LiMn_2O_4 and a lithium nickel oxide, LiNiO_2 . (col. 7 lines 55-60)

Pynenburg does not explicitly teach a lithium nickel manganese oxide. However, Hasegawa teaches replacing a portion of nickel in LiNiO_2 with manganese (Mn) so as to form lithium nickel manganese oxide, $\text{LiNiMn}_2\text{O}_4$. (col. 2 lines 35-40) Additionally, LiNiMnO is formed so that $\text{LiNi}_{1-x}\text{Mn}_x\text{O}_2$ is ($0.005 \leq x \leq 0.45$) Thus, at the time the invention was made, it would have been obvious to one of ordinary skill in the art to modify Pynenburg's invention by replacing a portion of nickel in LiNiO_2 with manganese to form LiNiMnO where ($0.005 \leq x \leq 0.45$). The motivation for such a modification would be to increase cell voltage and discharge capacity and allow for more stable compound synthesis, e.g. "the discharge capacity of the cell which comprises the positive electrode formed from the compound containing manganese is *increased* when compared with the cell which comprises the positive electrode formed from the compound containing no manganese ($x = 0$)." (col. 4 line 20 et seq.)

As to the weight ratio of lithium manganese oxide to the lithium nickel manganese oxide being less than 1, absent of unexpected results it is asserted that these are optimizable parameters for result-effective variables. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) While Pynenburg teaches a ratio from 1:10 to 10:1 in col. 7 lines 55-60, the relative proportions of the mixed oxide components are considered result-effective as the "cell capacity is proportional to the area under the curve of the differential cell capacity dQ/dV vs. voltage." (col. 8 line 47 et seq.)

As evidence to show the differences in cell capacity and discharge capacity for the prior art oxides, Imachi teaches (using line plots to illustrate Pynenburg's "area under the curve...

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dQ/dV") that lithium nickel manganese oxide ($\text{LiMn}_{0.5}\text{Ni}_{0.5}\text{O}_2$ in this example) has a *higher* discharge capacity at around 145 (est.) as compared to lithium manganese oxide (LiMn_2O_4 in this example) at around 120 (est.) See Figure 1. Furthermore, it appears to the examiner that the cell capacity for lithium nickel manganese oxide is higher. Thus, following Pynenburg's teaching, it would not require undue experimentation for the skilled artisan to focus on a lower ratio of lithium manganese oxides relative to lithium nickel manganese oxides. The motivation to do so is to optimize and maximize the result-effective total cell capacity, as evidenced by Imachi. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Applicant's arguments filed with the present amendment have been fully considered, however these arguments are not found persuasive. Applicant submits that neither Pynenburg or Hasegawa teach or suggest the claimed $\text{Li}_{1.03}\text{Ni}_{0.8}\text{Mn}_{0.2}\text{O}_2$. This argument is not persuasive. For the reasons discussed under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph (discussion above), as $\text{Li}_{1.03}$ is best understood as Li_1 , Hasegawa's LiNiMnO where $\text{LiNi}_{1-x}\text{Mn}_x\text{O}_2$ is ($0.005 \leq x \leq 0.45$) teaches or at least suggests applicant's claimed chemical formula.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian Anthony whose telephone number is (571) 272-1289. The examiner can normally be reached on Monday through Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

/Julian Anthony/
Examiner, Art Unit 1726

/Patrick Joseph Ryan/
Supervisory Patent Examiner, Art Unit 1726